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CARL T. JONES CORPORATION

STATEMENT OF WILLIAM J. GETZ
IN SUPPORT OF AN APPLICATION TO MODIFY
FIXED SATELLITE SERVICE
TEMPORARY-FIXED EARTH STATION E040399
FCC FILE NO. SES-LIC-20040927-01515

I am a Radio Engineer, an employee in the firm of Carl T. Jones Corporation, with offices located in Springfield, Virginia. My education and experience are a matter of record with the Federal Communications Commission.

This office has been authorized by WLS Television, Inc. to prepare this statement in support of an Application to modify the above-referenced, temporary-fixed earth station, Ku-band FCC license. Specifically, this application proposes to add two additional transportable Satellite News Gathering (SNG) antennas to the existing license. No further changes are proposed herein.

This Statement and the supporting Exhibits set forth the operational guidelines for the intended modification of License and submits material to demonstrate compliance with the Commission's Rules regarding human exposure to radiofrequency (RF) energy.

Proposed (Antenna-2) Technical Operation

Presently, the E040399 Fixed Satellite Service license allows for use of one transportable 1.5 meter Advent Communications satellite antenna mounted on top of a WLS-TV, Chicago, Illinois, Satellite News Gathering (SNG) truck. The Applicant proposes herein to add two new antennas to the existing license for use in connection with the WLS-TV SNG efforts. The two new antennas proposed herein are AvL Technologies 1.4 meter antennas and their technical operation is described below. No further changes are proposed herein.

For the AvL 1.4 meter antenna (Antenna-2), the planned input power to the system flange is 112.2 Watts RMS, which is the antenna input power required to produce the single carrier system's maximum EIRP of 65.0 dBW. Exhibit 1 lists the E040399 operating parameters, the Elevation Limit and Azimuth Limit calculations, and the Input Density calculations relevant to the proposed Antenna-2 operation.

The maximum EIRP is 65.0 dBW, and the maximum EIRP density in a 4 kHz band is 25.46 dBW in the main beam of the antenna. The gain of the AvL antenna is 44.5 dBi at 14.25 GHz (mid-band). The maximum Input Density for the proposed Antenna-2 is -19.04 dBW/4 kHz band toward the horizon.

The WLS-TV newsgathering efforts will occur only mainly in the Chicago area and generally in the Midwestern United States. Elevation and Azimuth angle calculation

7901 Yarnwood Court
Springfield, VA 22153-2899
tel: (703) 569-7704
fax: (703) 569-6417
email: info@ctjc.com
www.ctjc.com

results are shown on Exhibit 1. Those calculations show an elevation angle of 18.9 degrees or greater for all combinations of geographic locations opposite that of the geostationary arc location. At these elevation angles, the maximum EIRP Density toward the horizon is -18.95 dBW/4 kHz Band for a spacecraft at the extreme western limit of the arc and a temporary-fixed location in Chicago. The calculations in Exhibit 1 also show the maximum EIRP density toward the horizon for a typical Space Segment Provider, which is -19.04 dBW/4 kHz Band.

Proposed (Antenna-2) Power Density Calculations

The RFR calculations performed herein were made according to the methods which are described in FCC OET Bulletin 65 (Pages 19 through 29), Edition 97-01, which is dated August 1997. Section 1.1310 of the Commission's Rules was used to obtain the limits of maximum power density for both Controlled and Uncontrolled Environments. Pursuant to Section 1.1310 of the Rules, a maximum power density of 1.0 mW/cm^2 is permitted in Uncontrolled Environments in the band 14000 through 14500 MHz.

The results of RFR calculations pertinent to Antenna-2 are attached as Exhibit 2. As shown in Exhibit 2, the predicted power density in the main beam of the truck-mounted antennas exceeds the FCC limits for Uncontrolled Environments in almost every instance. The maximum power density at the surface of the antenna is 29.16 mW/cm^2, well above the limit of 1.0 mW/cm^2 is found in Section 1.1310 of the Commission's Rules for Uncontrolled Areas.

However, because the proposed Antenna-2 terminals will be limited to transmit only to satellites requiring antenna elevation angles greater than 20 degrees, areas at ground level to two meters above the ground are expected to meet the exposure requirements if a one meter safe distance is observed from any portion of the antenna.

In light of the above, the Applicant commits to procedures whereby the antenna will not be energized while the antenna is aimed toward buildings or other areas where persons could be present, as an exceptionally high level of radio frequency energy is present in the direction of the main beam. These high levels of power density can exceed the limits for Uncontrolled Environments for a substantial distance.

Further, in no case shall the station be operated before the antenna has been properly aimed skyward toward the correct satellite, and the path toward that satellite is known to be clear. In all cases, the roof of the truck where the antenna is mounted should be treated as a restricted area when the station is in operation. Although there are areas on the truck's roof where the predicted power density is within applicable limits, the Applicant nonetheless commits to prohibit access to the roof of the truck during operation of the station.

Conclusion

The operation of the transportable SNG system described herein meets the Commission's requirements for safety of workers and the general public from excessive exposure to radiofrequency energy when operated within the guidelines outlined above. The proposed facilities also meet the Commission's requirements for Satellite Earth Stations and the Commission's Rules regarding routine processing and operation, and a grant of this application would be in the public interest.

This Engineering Statement, various entries in FCC Form 312 Main Form and Schedule B, and the calculations to predict expected power density per OET Bulletin 65 were prepared by me or under my supervision and are believed to be true and correct.

DATED: December 9, 2016

William J. Getz

WLS-TV Ku-Band SNG, Antenna-2
Operating Parameters
Call Sign E040399

System Design Parameters

Maximum EIRP, All Carriers	65	dBW
Carrier 1: Program Video, Audio, Voice, Data		
Maximum EIRP	65	dBw
Maximum Bandwidth for Emission 36M0G7W	36000	kHz
Maximum EIRP Density per 4 kHz Segment	25.46	dBw/4kHz

Input Density Values

Antenna Diameter	1.4	meters
Antenna Gain at Mid-Band	44.5	dBi
Carrier 1 Input Density	-19.04	dBw/4kHz
Maximum Input Density (All Carriers)	**-19.04**	dBw/4kHz

Azimuth and Elevation Sample Calculations

Vehicle-Mount Transportable Satellite Antenna

From Chicago Coordinates: 41-52-44 N.L. & 87-38-08 W.L. (NAD-83)

Location	Description	Azimuth	Elevation	Sec. 25.209 Off-Axis Max Gain	Maximum EIRP toward the horizon dBw	dBw/4kHz
060° West	Full Arc Eastern Limit	141.8	34.2	0.00	20.50	-19.04
069° West	Limited Arc Eastern Limit	153.1	38.2	0.00	20.50	-19.04
125° West	Limited Arc Western Limit	228.9	28.8	0.00	20.50	-19.04
140° West	Full Arc Western Limit	242.8	18.9	0.09	20.59	-18.95

Typical Space Segment Provider

Location	Description	Azimuth	Elevation	Sec. 25.209 Off-Axis Max Gain	Maximum EIRP toward the horizon dBw	dBw/4kHz
091° West	Eastern Limit (Galaxy17)	185.1	41.7	0.00	20.50	-19.04
097° West	Western Limit (Galaxy16)	193.9	40.9	0.00	20.50	-19.04

Limited Arc
Maximum EIRP Density toward the Horizon **-19.04 dBw/4kHz**

Typical Space Segment
Maximum EIRP Density toward the Horizon **-19.04 dBw/4kHz**

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WLS-TV Ku-Band SNG, Antenna-2
RFR Power Density Calculations
Call Sign E040399

Pursuant to Section 1.1310 of the FCC Rules the FCC Guidline values for frequencies used by the satellite Ku uplink system are as follows:

Uncontrolled RFR Environment Guideline Value	1.0	mW/cm²
Controlled RFR Environment Guideline Value	5.0	mW/cm²

System Operating Constants

Antenna Actual Diameter	1.4	meters
Antenna Isotropic Gain	44.5	dBi
Nominal Frequency	14250	MHz
Maximum EIRP (All Carriers)	65	dBw
Lowest Antenna Elevation Angle	28.8	deg

System Calculations

Antenna On-Axis Isotropic Power Gain	28183.8	
Antenna 1 Degree Off-Axis Isotropic Power Gain	1584.9	
Antenna Off-Axis Isotropic Power Gain at Lowest Elev. Angle	0.356	
Aperature Efficiency (η)	0.645	
Maximum Input Power (All Carriers)	112.20	watts
Antenna Surface Area	1.5394	sq. meters
Nominal Wavelength	0.02104	meters
Near Field Limit (R_{nf})	23.3	meters
Far Field Limit (R_{ff})	55.9	meters

note: The Transition Region extends from R_{nf} to R_{ff}

RFR Power Density Calculations

Power Density at the Surface of the Antenna 29.1551 mW/cm²
OET Bulletin 65, Edition 97-01, Equation 11

Percent Uncontrolled Limit	2915.51%
Percent Controlled Limit	583.10%

Maximum Power Density On-Axis Near Field Region 18.8005 mW/cm²
OET Bulletin 65, Edition 97-01, Equation 13

Percent Uncontrolled Limit	1880.05%
Percent Controlled Limit	376.01%

Maximum Power Density On-Axis in The Transition Region 18.8005 mW/cm²

OET Bulletin 65, Edition 97-01, Equation 17

Percent Uncontrolled Limit 1880.05%
Percent Controlled Limit 376.01%

Maximum Power Density On-Axis in The Far-Field Region (S_{ff}) 8.0535 mW/cm²

OET Bulletin 65, Edition 97-01, Equation 18

Percent Uncontrolled Limit 805.35%
Percent Controlled Limit 161.07%

Maximum Power Density 1° Off-Axis in The Far-Field Region 0.4529 mW/cm²

Off-Axis Power Gain/On-Axis Power Gain = 0.056234133

Off-Axis Power Density in Far Field and Beyond = Ratio x S_{ff}

Percent Uncontrolled Limit 45.29%
Percent Controlled Limit 9.06%

Evaluation of Safe Occupancy Area in Front of Antenna at Lowest Elevation Angle

Power Density One Meter from Antenna 0.8139 mW/cm²

OET Bulletin 65, Edition 97-01, Equation 7

Percent Uncontrolled Limit 81.39%
Percent Controlled Limit 16.28%

Power Density Two Meters from Antenna 0.2035 mW/cm²

OET Bulletin 65, Edition 97-01, Equation 7

Percent Uncontrolled Limit 20.35%
Percent Controlled Limit 4.07%

Power Density Three Meters from Antenna 0.0904 mW/cm²

OET Bulletin 65, Edition 97-01, Equation 7

Percent Uncontrolled Limit 9.04%
Percent Controlled Limit 1.81%